Kansas Department of Health and Environment Administrative Regulations
Article 35.—Radiation
Veterinary Facilities

***Note: Throughout this document, KDHE refers to: Kansas Department of Health and Environment, Radiation Control Program.

Part 1—Definitions

K.A.R. 28-35-135 through K.A.R. 28-35-135y. ***Definitions***
If you are unsure of the definition of anything in the regulations, here is where you go to find most them.

K.A.R. 28-35-137. ***Records***
Each licensee or registrant shall keep records showing the receipt, transfer, and disposal of all sources of radiation, and any other records specifically required by these regulations.
What this means: Any time you purchase, sell, or dispose of/scrap an X-ray producing device, you should receive documentation from the vendor documenting the purchase or otherwise document the sale or disposal of the X-ray unit. You should also inform the state within 30 days of any of these events occurring. State-specific forms can be found on our website.
What we expect from you: All documentation of X-ray equipment purchase, transfer and disposal (including copies of the forms sent in to the state) need to be kept for the life of the practice.
Why: This helps us track ownership of X-ray producing devices to ensure their safe and responsible use.

K.A.R. 28-35-138. ***Inspections***
(a) Each licensee or registrant shall afford, at all reasonable times, the secretary or the secretary's duly authorized representative the opportunity to inspect sources of radiation and the premises and installations in which such sources of radiation are used or stored.
(b) Each licensee or registrant, upon reasonable notice, shall make available, for inspection by the secretary or the secretary's duly authorized representative records maintained pursuant to these regulations.
What this means: The state of Kansas is allowed to inspect any facility that uses radiation producing devices. Part of this inspection is reviewing all records pertaining to your X-ray equipment and its use.
What we expect from you: Allow us to come into your facility and complete our inspections. Have all records pertaining to your X-ray machines handy so we can review them (what records are expected can be found throughout this document).
Why: This helps us to ensure your compliance with state regulations and ensure that X-ray equipment is being used and maintained safely.

K.A.R. 28-35-139. ***Testing and Surveys***
(a) Each licensee or registrant shall make, or cause to be made, those surveys that are necessary for the licensee or registrant to comply with these regulations.
(b) Each licensee or registrant shall perform, upon instructions from the department, or shall permit the department to perform, such reasonable tests as the department deems appropriate or necessary.
What this means: Part of the inspection process involves us testing your equipment. The state of Kansas also has the right to request you to perform tests on your equipment.

What we expect from you: Allow us to come into your facility and conduct our tests. Respond to any requests for testing in a timely manner.
Why: This allows us to ensure that your equipment is functioning as it should. We have equipment that reads the X-ray output of your machines, verifying that your patients only receive as much radiation as you intend.

K.A.R. 28-35-141. ***Additional Requirements***

At the time of registration, at the time of action upon application for license or amendment to the license, or upon inspection, the department shall specify any requirements or conditions of use, or both, that are necessary to ensure compliance with these regulations under the usage to which the licensee or registrant proposes to put the source of radiation.
What this means: The state of Kansas will tell you if you are found to be non-compliant and which regulations you are in violation of.
What we expect from you: Following inspection, if we find you to be non-compliant, you will be sent a letter outlining any issues. You will be given 30 days to respond to the letter and take any corrective action necessary. If any questions arise while you are in the process of becoming compliant, contact your inspector for clarification. This regulation also applies to issues of equipment registration and fee payment; you will be informed if you are non-compliant and you are expected to comply in a timely manner.
Why: The letter you receive following an inspection should detail exactly what needs to be fixed and why. This way, there will be no surprises, and you know if you address all the issues within the letter, you are back in compliance.

K.A.R. 28-35-145 through 28-35-147a. ***Registration Fees***

28-35-145. **Initial license and registration fees.** (b) Each person required under part 2 of these regulations to register a radiation machine shall submit to the department a registration form and the applicable nonrefundable registration fees specified in K.A.R. 28-35-147a.
28-35-146. **Annual license and registration fees.** (c) Annual registration fees. Each registrant shall submit to the department a registration form and the applicable nonrefundable annual registration fees specified in K.A.R. 28-35-147a on or before March 1.
28-35-147a. **Schedule of fees.** Each fee for an initial license application or registration shall be equal to the sum of the annual fees for all applicable categories. Each annual fee for a license or registration shall be equal to the sum of the annual fees for all applicable categories.

(k) X-ray machines.
(1) Base registration fee per facility.
Annual fee $200.00
(2) Registration fee for each X-ray tube at a facility. This fee shall be in addition to the base registration fee.
Annual fee per X-ray tube $50.00

What this means: Any X-ray machine you possess needs to be registered with the state. There are initial and yearly registration fees associated with registration.
What we expect from you: When you buy/sell/dispose of an X-ray producing device, you are expected to inform the state and adjust your fees accordingly. Annual fees are due on or before March 1st.
Why: This is another method for tracking use of X-ray machines in the state.

K.A.R. 28-35-148. ***Deliberate Misconduct***
(b) Each individual…who knowingly provides to any licensee, applicant, registrant, contractor, or subcontractor any components, equipment, materials, or other goods or services that relate to a licensee's, registrant's, or applicant's activities in this article shall be prohibited from engaging in deliberate misconduct.
What this means: X-rays are not to be used for anything other than their intended purpose.
What we expect from you: Do not use X-rays for anything other than their intended use. In veterinary practice, this means they are only to be used for the diagnosis and treatment of animals. Your X-ray equipment is not to be used for diagnosis on any humans. All X-rays require an order by a provider and are to be taken by a trained professional.
Why: This is to ensure that X-rays are used safely and responsibly.

Part 2—Radiation Producing Machines

K.A.R 28-35-152. ***Persons registered*.**
Any person possessing a registrable item shall register with the department in accordance with the rules and regulations in this part.

Link to our equipment registration page:
http://www.kdheks.gov/radiation/xray_equip_registration.htm

What this means: Anyone who owns an X-ray producing device needs to register it with the state.
What we expect from you: You are expected to register new equipment and maintain a current registration with the state. You are also expected to keep all records related to X-ray registration.
Why: Registration of X-ray producing devices allows us to track what is being used by who in the state of Kansas and provides us with a method for tracking safety concerns and regulatory compliance.

K.A.R. 28-35-153. ***Initial registration*.**
Any person who is not registered and who acquires possession of a registrable item shall register with the department, within 30 days of the date of acquiring the item.
What this means: You have 30 days from acquiring an X-ray producing device to register it with the state.
What we expect from you: It is your responsibility to print off, fill out, and send in registration forms with the appropriate fees.

K.A.R. 28-35-155. ***Registration form*.**
Registration shall be made upon forms devised and furnished by the department. Each registrant shall provide all the information called for by the form and any additional information requested by the department.
What this means: State provided forms need to be used when registering new X-ray equipment.
What we expect from you: It is your responsibility to print off, fill out, and send in registration forms. Annual registration can be paid by mail with a check, or through email with a credit card.

Link to our equipment registration page:
http://www.kdheks.gov/radiation/xray_equip_registration.htm

K.A.R. 28-35-158. ***Report of change.***
If a change is made on any X-ray equipment or other device producing radiation, or to any installation, so that information on file with the department is no longer accurate, the registrant

shall notify the department, in writing, of the change, within 30 days of the date the change was made.
What this means: If the number or type of X-ray producing devices in your possession changes, the state must be notified within 30 days.
What we expect from you: It is your responsibility to contact the state and inform us of any changes.

K.A.R. 28-35-159. ***Registration shall not imply approval.***
A person shall not refer, in any form of advertisement, to the fact a registrable item is registered with the department, or state or imply that any installation registered with the department is approved by the department.
What this means: "State registration" is not synonymous with approval and should not be advertised.
What we expect from you: Do not advertise that your equipment is state registered or approved.

K.A.R. 28-35-161. ***Discontinuance of use*.**
If a registrant ceases to use a registrable item or items, for any reason, the registrant or the duly authorized representative of the registrant's estate shall give written notice to the department of the cessation of use. The notice shall be provided within 30 days of the date that the registrant ceases to use the registrable item or items and shall state the date on which use of the item or items was discontinued and the manner in which the registrable item or items were disposed.
What this means: If you permanently stop using an X-ray machine in your possession, the state needs to be notified within 30 days.
What we expect from you: It is your responsibility to inform KDHE when you stop using an X-ray producing device.

K.A.R. 28-35-164. ***Temporary use or storage of registrable items*.**
Any person desiring to bring a registrable item into this state for temporary use or storage shall give written notice to the department before bringing the item into this state. The notice shall be given to the department at least five days before the item is to be brought into this state and shall include the type and energy of the radiation source, the nature and scope of the use or storage, the proposed duration of use or storage, and the exact location where the radiation source is to be used or stored. If, in a specific case, the five-day period would impose an undue hardship on the person, the person, upon application by letter or telegram to the department, may obtain permission to proceed at an earlier date.
What this means: If an X-ray producing device is going to be brought into Kansas, even on a temporary basis, KDHE needs to be notified at least five days before it is brought into the state.
What we expect from you: If an X-ray producing device is being brought to your office for demonstration purposes, or to temporarily replace a piece of your equipment that is out for repairs, it is your responsibility to make sure KDHE is notified 5 days before it arrives in Kansas.

K.A.R. 28-35-165. ***Disposal of registered items.***
Link to X-ray change of status form:
http://www.kdheks.gov/radiation/forms/Xray_machine_status_frm.pdf

Link to affidavit of disassembly:
http://www.kdheks.gov/radiation/forms/AFFIDAVIT_OF_DISASSEMBLY.pdf

Whenever any person disposes of a registrable item, or items, by any method, the person, or in the event of the person's death, the representative of the person's estate, shall give written notice to the department of the disposal within 30 days. The notice shall include the date of disposal, the method of disposal, and, if transferred to another person, the name and address of the recipient.
What this means: If an X-ray machine registered to you is sold or scrapped, KDHE needs to be notified within 30 days.
What we expect from you: It is your responsibility to print off, fill out, and send in the forms for disposal/transfer of an X-ray machine to KDHE.

K.A.R. 28-35-167 through K.A.R. 28-35-169. ***Shielding Plans***
Link to Shielding Plan Review Form:
http://www.kdheks.gov/radiation/forms/shielding_plan_review_form.pdf

28-35-167. Shielding plan for radiation producing devices**.** (a) Before construction, the floor plan or plans, shielding specifications, and equipment arrangement of all new installations, or modifications of existing installations, utilizing ionizing radiation machines shall be submitted to the department for review and consideration for approval.
What this means: Before new construction or remodeling, shielding plans detailing safe storage and use of radiation producing devices need to be submitted to KDHE for review. We may require the use of a radiation physicist or other qualified specialist in testing and creating these plans, at your expense. Initial approval does not mean permanent approval. We can require additional shielding be added or other modifications made if there are changes in equipment or number or exams. You may be required to submit another shielding plan if it is determined that changes are needed.
What we expect from you: It is your responsibility to have a shielding plan made and approved prior to any new construction or remodeling. You must keep all paperwork and communication related to the shielding plan for the life of the practice. This paperwork must be available for review at your inspections.
Why: Shielding plans are required to help ensure the safety of your employees, patients, and anyone who could possibly be near the radiation producing devices. They consider construction material and added shielding to demonstrate radiation levels beyond the immediate area of the radiation producing device.

Part 4—Standards for Protection Against Radiation

K.A.R. 28-35-211d. ***Radiation protection programs.***
(a) Each licensee or registrant shall develop, document, and implement a radiation protection program sufficient to ensure compliance with the provisions of these regulations. (d) Each licensee or registrant shall, at intervals not to exceed 12 months, review the radiation protection program content and implementation.
What this means: Every facility that uses radiation producing devices need to have written radiation safety procedures and policies. A program must be in place to ensure these policies are followed and reviewed at least annually. The ALARA principles of time (short exposures), distance (X-ray workers should be at least 6 feet from the X-ray machine when taking exposures) and shielding (for employees) should be addressed in these policies.
What we expect from you: It is your responsibility to make and implement a radiation protection program for your facility. A written version of this needs to be kept on file for review during inspections. Documentation of annual review of policies and procedures also needs to be maintained and available for inspection.

Why: The creation of a radiation protection program ensures that everyone working around X-rays knows what is expected of them. It helps ensure employee safety and responsible use of radiation.

K.A.R. 28-35-212a. ***Occupational Dose Limits for Adults***

(a)Each licensee or registrant shall control the occupational dose to individual adults
(c)(3) All individuals who are associated with the operation of an X-ray system shall be subject to the occupational exposure limits and the requirements for the determination of the doses that are specified in this regulation.
(f) Each licensee or registrant shall reduce the dose that an individual may be allowed to receive in the current year by the amount of occupational dose received while employed by any other person

NOTE: *The following sections include information about occupational dose limits for minors (K.A.R. 28-35-213a), dose to embryo or fetus (K.A.R. 28-35-213b), dose limits for individual members of the public (K.A.R. 28-35-214a and K.A.R. 28-35-214b), and information about preventing deceptive exposure of a monitoring device (K.A.R. 28-35-217b).*

Link to Exposure Monitoring companies:
http://www.kdheks.gov/radiation/download/radiation_monitor_company.pdf

What this means: The annual dose limit for an occupationally exposed X-ray worker is 5000 mrem. This is most often kept track of using personal dosimetry badges. Monitoring is required by state regulations.
What we expect from you: It is your responsibility to ensure that your employees are receiving minimal exposure to radiation. It is your responsibility to purchase and correctly use personal monitoring badges for your employees.
Why: Occupational exposure to radiation, even in small amounts, can have a cumulative effect on X-ray workers. The personal monitoring badges allow an individual's exposure to be tracked and interventions to be made before exposure rates become dangerous.
NOTE: If the worker is likely to receive, in a year the occupational dose requiring monitoring, you must attempt to obtain the records of lifetime cumulative occupational radiation dose from previous facilities.

K.A.R. 28-35-219a. ***Caution Signs and Labels***

(a)(1) Except as otherwise authorized by the department the symbol prescribed by this regulation shall use the conventional radiation caution colors, which are magenta, purple, or black on a yellow background
What this means: In areas where X-rays are regularly used, signs must be posted that alert people to the use of radiation.
What we expect from you: In veterinary practice, requirements are specific to the equipment. Standard veterinary X-ray machines should have radiation caution signs on the machines themselves.
Why: Employees and the public need to be aware when they have entered a radiation area, or their pet is having an exam involving radiation.

K.A.R. 28-35-222a and K.A.R. 28-35-228a. ***Security and control of sources of radiation***

28-35-222a; Each licensee or registrant shall secure from unauthorized removal or access all licensed or registered sources of radiation that are stored in controlled or unrestricted areas.
28-35-228a; Reports of theft or loss of sources of radiation. (a) Each licensee or registrant shall report… to the department the theft or loss of the following sources of radiation immediately after

the occurrence becomes known to the licensee or registrant. (b)The licensee or registrant shall also submit a report, in writing, within 30 days after learning of stolen, lost, or missing sources of radiation.
What this means: X-ray producing devices need to be stored in such a way that they cannot be removed from the premises, and people without proper training cannot access them. If, despite proper precautions, one of your registered devices is stolen, KDHE must be notified immediately. A written report must be submitted to the department in within 30 days.
What we expect from you: Most floor mounted X-ray units already meet these requirements. However, care should be taken to prevent the public unsupervised access to them. X-ray units require extra security and control. Mobile or portable X-ray units must be secured at the end of each day's use. It is your responsibility to alert KDHE immediately, and file a report within 30 days, if one of your devices goes missing.
Why: X-rays are potentially dangerous; especially in the hands of people without proper training.

K.A.R. 28-35-227d. ***Records of surveys.***
(a) Each licensee or registrant shall maintain records showing the results of surveys and calibrations required by K.A.R. 28-35-217b and K.A.R. 28-35-221a(b). Each licensee or registrant shall retain each of these records for three years after the record is made.
What this means: Any results from inspections, repairs, service calls, and routine calibrations need to be maintained by your office for at least three years.
What we expect from you: If needed, you are expected to be able to produce records requested by your state inspector.
Why: This allows us to ensure that your equipment is being correctly maintained and you are in compliance with various other regulations.

K.A.R 28-35-227h. ***Records of individual monitoring results.***
(a) Each licensee or registrant shall maintain records of the doses received by all individuals for whom monitoring was required.
(e) Each licensee or registrant shall retain each required form or record until the department terminates each pertinent license or registration requiring the record.
What this means: Any records related to employee dose monitoring needs to be kept for the life of the practice. Employees need to be able to review their monitoring records.
What we expect from you: It is your responsibility to ensure that monitoring records are maintained on site until registration of your facility is terminated, and to allow employees access to their radiation exposure records. You must be able to produce monitoring records for review during state inspections.
Why: Compliance with this regulation provides documentation that your employees are receiving minimal radiation doses.

K.A.R. 28-35-229a. ***Notification of incidents*.**
(a) Immediate notification. Each licensee or registrant shall immediately notify the department by telephone, telegraph, mailgram or facsimile of any incident involving any source of radiation possessed by the licensee or registrant which may have caused or threatens to cause: (1) (A) a total effective dose equivalent to any individual of 25 rems (250 mSv) or more of radiation.
What this means: If a monitored individual receives more than the monthly allowable dose, KDHE must be notified immediately.
What we expect from you: This is unlikely to happen in a veterinary office. However, if overexposure does occur, it is your responsibility to notify KDHE immediately.
Why: This allows us to track overexposures and help prevent them from happening again.

Part 5—Use of X-rays in the Healing Arts

K.A.R. 28-35-242. ***General Requirements***

(a) Waiver of requirements. Compliance with the specific requirements of these regulations relative to an existing machine or installation may be waived by the secretary if the registrant provides an alternative to the requirement that provides an alternative to the requirement that provides radiation protection equal to that prescribed in part 4 of these regulations.

(c) Limitations on human use. An individual shall not be exposed to the useful beam, unless the exposure is for healing arts purposes and each exposure has been authorized by one of the following: (1) A licensed practitioner of the healing arts: (2) a physician assistant licensed by the state board of healing arts, when working under the supervision and direction of a person licensed to practice medicine or surgery; (3) an advanced registered nurse practitioner who holds a certificate of qualification from the state board of nursing, when working under the supervision and direction of a person licensed to practice medicine or surgery; or (4) an individual licensed to practice dentistry or podiatry within the authority granted to the individual by Kansas licensing laws applying to dentists or podiatrists.

(d) Prohibited uses. Deliberate exposure for the following purposes shall be specifically prohibited: (1) Exposure of an individual for patient positioning, training, demonstration, or other purposes, unless a healing arts purpose exists and a proper prescription has been provided; and (2) exposure of an individual for the purpose of healing arts screening without the prior written approval of the department, except mammography by the food and drug administration.

What this means: (a) The only waiver that would be granted to a veterinary facility would be for the use of a handheld dental X-ray unit. Handheld X-ray units are not allowed in Kansas per regulations. There are only four handheld dental X-ray units that are approved to be sold in Kansas and each manufacturer has been granted a waiver to do so. (c) While this does not really apply to a veterinary facility, X-rays are not to be taken of anyone unless it is medically warranted and explicitly ordered by a licensed practitioner in the state of Kansas such as an MD, DO, DPM or DC. In veterinary practice, only animals shall be the patient and no X-rays shall be taken on a human. (d) It is prohibited to expose patients for the purpose of training or demonstration purposes. If a new X-ray unit is installed in your facility, patients shall not be imaged to learn to use the equipment unless there is a medial reason to do so.

What we expect from you: (a) If you have purchased a handheld dental X-ray unit, you must complete the appropriate paperwork to apply for a waiver to use it. The request for waiver must be completed and reviewed by KDHE to determine approval. (c) While this regulation applies to human patients, there have been situations that veterinary facilities have completed an X-ray on a human and this is prohibited. (d) Unless there is a medical need for an X-ray image of a veterinary patient, the animal should not be imaged for training purposes.

Why: (a) Handheld X-ray units are not allowed in Kansas per regulations. These units require specific training, safety procedures, lead aprons and dosimetry. The use of one of these units without a waiver from KDHE is prohibited. (c) Veterinary patients are animals and only animals. No humans shall be imaged at a veterinary facility. (d) Any exposure at a veterinary facility is higher dose to the operator. If the X-ray does not serve a diagnostic purpose, there is no need to add to the occupational exposure of any staff in the room during the X-ray.

NOTE: If a veterinary facility wishes to purchase a handheld dental X-ray unit, they must complete an RH-92 Request Hand Held X-ray Waiver Form with all requested information and submit this to KDHE for approval before use. There are several conditions that the facility must agree to follow to maintain this approval.

*****Currently, the only handheld dental X-ray units granted waivers for sale and use in the state of Kansas are KaVo Nomad Pro and Nomad Pro 2, Digital Doc XTG MiniX-S and Maxray Cocoon.******

Link to RH-92 Request for Hand Held X-ray Waiver form:
http://www.kdheks.gov/radiation/download/RH-92_Handheld_Dental_Unit_Waiver.pdf

K.A.R. 28-35-242a. ***Administrative Requirements***
(a) Radiation safety requirements. Each registrant shall be responsible for directing the operation of each X-ray system under the registrant's administrative control. The registrant or the registrant's agent shall ensure that the requirements of this part, which shall include the following requirements, are met.
(1) An X-ray system not meeting the provisions of these regulations shall not be operated for diagnostic purposes.
(2) Each individual who operates any X-ray system shall be instructed in the safe operating procedures and shall be competent in the safe use of the equipment… Any combination of interview, observation, and testing may be used by the secretary to determine compliance.
What this means: No X-ray system shall be operated for diagnostic purposes unless it meets the provisions of these regulations. The equipment shall be maintained to manufacturer's specifications and if the equipment is not operating properly, it shall require service to bring it back to operating as intended. All employees that take X-rays need to be trained how to safely use the equipment.
What we expect from you: It is your responsibility to ensure that your employees are trained to use the X-ray equipment. It is also your responsibility to maintain records documenting their training and provide these records for review during state inspections. In a veterinary setting, X-ray workers are not required to be licensed by the state of Kansas. However, on the job, school based, or vendor provided training is required.
Why: Having a properly trained staff ensures not only their safety, but the safety of your patients.

K.A.R. 28-35-242a(a)(3). ***Technique Chart***
A chart shall be made available to the operator of each diagnostic X-ray system that specifies, for each examination performed with the system, the following information:
(A) The technique factors to be utilized, taking into account the patient's body part and anatomical size, body part thickness, and age
What this means: A technique chart must be made available to the operator of each diagnostic X-ray system that specifies the technique factors that consider the patient size, body part, etc.
What we expect from you: In your office, what is the technique used for an abdomen? What about other frequently taken images? How do you adjust the technique for a small animal? Or a very large animal? The answers to these questions needs to be available to the X-ray worker. Each X-ray machine should have a technique chart posted next to the control panel to ensure proper techniques are being utilized. These charts should be available for review during state inspections. These technique charts may also be in electronic form in the control panel of the X-ray machines.
Why: This ensures that patients are not overexposed during their exams.

K.A.R. 28-35-242a(a)(4). ***Safety Procedures***
The registrant of a facility shall create and make available to all X-ray operators written safety procedures, including patient holding procedures and any restrictions on the operating techniques required for the safe operation of the particular X-ray system. The registrant shall ensure that the operator demonstrates familiarity with these procedures.

What this means: Written procedures to ensure safe use of X-rays need to be created and made available to your staff.
What we expect from you: It is your responsibility to create X-ray safety procedures to be followed in your office. These procedures should address issues of patient and X-ray worker safety, as well as any restrictions on the machine. It is also your responsibility to ensure that your employees are familiar with all safety procedures, have access to written versions, and review the procedures at least annually. Specific safety issues to be included in your procedures are addressed in following regulations.
Why: This ensures that all your employees are on the same page when it comes to the safe use of radiation producing equipment.

K.A.R. 28-35-242a(a). ***Patient holding/shielding***

(5) Except for patients who cannot be moved out of the room, only the staff, ancillary personnel, and any other individuals required for the medical procedure or training shall be in the room during the radiographic exposure. All of the following requirements shall be met for each individual other than the patient being examined: (A) Each individual shall be positioned so that no part of the body will be struck by the useful beam unless the body part is protected by not less than 0.5 millimeter of lead-equivalent material. (B) The X-ray operator, other staff, ancillary personnel, and all other individuals required for the medical procedure shall be protected from the direct scattered radiation by protective aprons or whole-body protective barriers of not less than 0.25 millimeter of lead-equivalent material.
(6) Gonad shielding of not less than 0.5 millimeter of lead-equivalent material shall be used during radiographic procedures…except for cases in which this shielding would interfere with the diagnostic procedure.
(7) If a patient or film requires auxiliary support during a radiation exposure, all of the following safety requirements shall be met: (A) Mechanical holding devices shall be used when the technique permits the use of these devices. The written safety procedures required by this regulation shall list the individual techniques for which holding devices cannot be utilized.
(7)(C) The human holder shall be instructed in personal radiation safety and shall be protected in accordance with these regulations.
(7)(D) No individual shall be used routinely to hold film or patients.
(7)(F) Each facility shall have a sufficient number of leaded aprons and gloves available to provide protection to all personnel who are involved with X-ray operations and who are otherwise not shielded.
What this means: Only staff and any other individuals required for the procedure are to be in the room during radiographic exposure. If there must be staff in the room, they must be positioned so that no part of their body will be struck by the X-ray beam unless they are protected by not less than a 0.5 mm lead apron. The X-ray operator must be protected by not less than a 0.25 mm lead apron. X-ray operators that hold veterinary patients should be familiar with radiation safety principles and follow these regulations. No individual will be the designated "holder." There should be a sufficient number of lead aprons and gloves for all staff who help hold veterinary patients during X-ray exams.
What we expect from you: In a veterinary facility, all X-ray machines must have the ability to be operated with a dead-may type exposure switch with an electrical cord of sufficient length so that the operator can stand outside the useful beam and at least six (6) feet from the animal during the exposure. Since most X-ray exams in veterinary practice require human holders of the animal, every attempt to lessen exposure to the staff must be taken. The X-ray worker must protect themselves with a lead apron and make sure no part of their body is in the path of the X-ray beam. If the staff holding the animal has hands near the X-ray beam, lead gloves should be utilized to keep

their hands protected. It is your responsibility to make sure your employees are aware of and abide by these safety regulations.
Why: This helps ensure that your employees are not receiving unnecessary radiation.

K.A.R. 28-35-242a(a)(8)(A). ***Film Screen***

The speed of the screen and film combinations used shall be the fastest speed that is consistent with the diagnostic objective of the examinations.
(B) The radiation exposure to the patient shall be the minimum exposure required to produce images of good diagnostic quality.
What this means: Film speed determines film sensitivity. The faster the film, the less exposure required to produce a good image. The fastest film that works with your system and provides you with good diagnostic images should be used. Regardless of what film speed is used, patients should be subjected to the smallest amount of radiation necessary to produce a useful image. Optimum exposure settings are also required if using a digital imaging system. A method must be in place to indicate when the image achieves proper adjustment between exposure and image quality.
What we expect from you: It is your responsibility to ensure that the film being used is appropriate for your equipment and for the desired images. It is also your responsibility to ensure that the lowest radiation dose necessary to produce good images is used. It is your responsibility to get your machine calibrated and/or adjust your technique. If your images are digital, your X-ray operators must know if the image is meeting image quality standards of the equipment and how that is determined. Most digital equipment provides a range of values for acceptable digital images. Your staff must be aware of how this is determined in your digital X-ray imaging system.
Why: Adhering to this regulation makes sure that your patients and X-ray operators do not receive excessive radiation during routine X-rays.

K.A.R. 28-35-242a(b). ***Records.***

Each registrant shall maintain the following minimum information for each X-ray system, for inspection by the department: (1) The maximum rating of technique factors;
(2) the model and serial numbers of all certifiable components; (3) the aluminum-equivalent filtration of the useful beam, including any routine variation; (4) tube rating charts and cooling curves; (5) records of surveys, calibrations, maintenance, and modifications performed on the X-ray system after the effective date of this regulation, with the name of each person who performed these services; (6) a scale drawing of the room in which a stationary X-ray system is located, indicating the use of areas adjacent to the room and an estimation of the extent of occupancy by any individuals in these areas. (7) a copy of all correspondence with the department regarding that X-ray system.
What this means: The department can and will inspect paperwork related to any X-ray producing devices in your possession. This includes the operator's manual and installation manual, which should include all the technical specifications referenced in this regulation. Documentation of any maintenance, modification, or repair done to the X-ray equipment, including the name of the person performing the work, needs to be maintained for the life of the machine. Other paperwork that must be maintained and readily available include a scale drawing of the X-ray room and all correspondence with the department.
What we expect from you: It is your responsibility to keep all records related to your X-ray equipment. This includes, but is not limited to; an operators manual, model and serial numbers, maintenance records, radiation monitoring records, a scale drawing of the X-ray room and occupancy estimations of surrounding areas (these are part of your shielding plan), and any communications with KDHE.

Why: This regulation serves as a protection for you. By maintaining copies of all paperwork related to your X-ray producing devices, you ensure that there can be no questions about maintenance or anything else related to regulation compliance.

K.A.R. 28-35-242a(d)(1)(A). ***Manual film processing***

Each manual film-developing system shall meet all of the following requirements: (i) The processing tanks shall be constructed of mechanically rigid, corrosion-resistant material. (ii) The temperature of the solutions in the tanks shall be maintained within the range of 60 F to 80 F. All film shall be developed in accordance with the time-temperature relationships recommended by the film manufacturer (iii) Devices shall be utilized that indicate the actual temperature of the developer and signal the passage of a preset time appropriate to the developing time required.
What this means: The facility must have suitable equipment for handling and processing film according to regulations. If this is a manual system, the processing tank must be constructed of appropriate material and the temperature of the solutions must be maintained at the proper range. All film shall be developed in accordance to time-temperature relationships recommended by the film manufacturer or the time-temperature chart in the regulations.
What we expect from you: It is your responsibility to make sure that any manual film processing occurring at your facility is being done per manufacturer's specifications. Equipment and chemicals used for processing as well as processing technique should be in line with the requirements for the film. You must have a thermometer and timer to use to manually develop films. Temperature and emersion times need to be posted in the dark room.
Why: X-ray film processing/image processing is important. Correct film processing directly impacts the readability of your films as well as the X-ray doses received by your patients.

K.A.R. 28-35-242a(d)(1)(B) ***Automatic film processing***

Each automatic processor and any other closed processing system shall meet all of the following requirements: (i) All film shall be developed in accordance with the time-temperature relationships recommended by the film manufacturer. (ii) The specified developer temperature and immersion time shall be posted in the darkroom or on the automatic processor.
What this means: Automatic film processors need to be used as the manufacturer intended. All film needs to be developed in the appropriate time and temperature settings as specified by the manufacturer.
What we expect from you: It is your responsibility to ensure that your automatic processor meets regulations. This includes changing out/replenishing chemicals and any maintenance or repairs. Temperature and time specifications need to be posted on the processor.
Why: X-ray film processing/image processing is important. Correct film processing directly impacts the readability of your films as well as the X-ray doses received by your patients.

K.A.R. 28-35-242a(d)(2)(B) ***Darkroom/Film storage***

The darkroom shall be lighttight and shall use safe lighting so that any film type exposed in a cassette to X-radiation sufficient to produce an optical density measuring from one to two when processed does not exhibit an increase in density greater than 0.1 when exposed in the darkroom for two minutes with all safe lights on. If daylight film-handling boxes are used, these boxes shall prevent any fogging of the film. (D) All film shall be stored in a cool, dry place and shall be protected from exposure to stray radiation. Film in open packages shall be stored in a lighttight container. (F) Outdated X-ray film shall not be used for diagnostic radiographs.
What this means: Film needs to be stored and handled in such a manner that it is not exposed to light. Precautions include using a lighttight darkroom and film handling boxes. Film should be stored in a cool, dry, lighttight place. Expired film should not be used.

What we expect from you: It is your responsibility to ensure that your film in being stored and handled in a way that does not compromise the integrity of the film. This is partially achieved by utilizing a lighttight darkroom and film handling boxes. It is your responsibility to ensure that film is being stored correctly and expired film is not being used.
Why: X-ray film handling is important. Correct film handling directly impacts the readability of your films as well as the X-ray doses received by your patients.

K.A.R. 28-35-242b. ***General Requirements for all diagnostic X-ray systems***

(a)Warning label. The control panel containing the main power switch shall bear this or an equivalent warning statement, which shall be legible and accessible to view: "WARNING: This X-ray unit could be dangerous to patient and operator unless safe exposure factors and operating instructions are observed."
(b) Battery charge indicator. On each battery powered X-ray generator, a visual means shall be provided on the control panel to indicate whether the battery is in a state of charge for proper operation.
(c) Leakage radiation from the diagnostic source assembly. The leakage radiation from the diagnostic source assembly measured at a distance of one meter in any direction from the source shall not exceed 25.8 C/kg (100 milliroentgens) in one hour when the X-ray tube is operated at the leakage technique factors specified by the manufacturer.
What this means: All X-ray producing devices are required to have warning labels on the control panel. All battery powered X-ray machines are required to have a mechanism for displaying how charged the battery is. Radiation leakage from diagnostic X-ray machines must be less than 100 milliroentgens per hour at one meter from the source.
What we expect from you: It is your responsibility to ensure that all your equipment is labeled correctly and functioning properly. Warning labels should be easy to read and should not be removed from the equipment. Battery operated equipment should be capable of holding a charge that can produce diagnostic level X-rays. A mechanism for determining this must be visible on the control panel. Significant radiation leakage from the X-ray source is prohibited. If leakage is suspected, it is your responsibility to have it evaluated by a qualified expert and repaired.
Why: Like so many other regulations, these three have to do with safety. Operators should be aware that the equipment they are using is potentially dangerous. Operators should also be aware if their battery-operated equipment is charged enough to produce a good image before they expose the patient. This will help cut down on repeat exposures. Radiation leakage isn't good for anyone, especially X-ray workers who are around the equipment daily.

K.A.R. 28-35-242b(e)(1). ***Half-value layer.***

(A) The half-value layer of a given X-ray tube potential shall not be less than the values shown in table I in this paragraph. Linear interpolation and extrapolation may be used if necessary to determine the half-value layer at an X-ray tube potential that is not listed in table I. Table I can be accessed on the Radiation Control Program Website at:
http://www.kdheks.gov/radiation/download/Half-value_Layer_table_from_regulations.pdf.
(C) The required minimal half-value layer of the useful beam shall include the filtration contributed by all materials that are permanently located between the source and the patient.
(2) Filtration controls. For each X-ray system that has variable kVp and variable filtration for the useful beam, a device shall link the kVp selector with the filter or filters and shall prevent an exposure, unless the minimum amount of filtration necessary to produce the required HVL is in the useful beam for the given kVp that has been selected.
What this means: Half-value layer refers to the amount of a material (usually aluminum or aluminum equivalent) required to reduce the X-ray beam's intensity by half for a given kVp. This measurement is used to determine if an X-ray producing device has enough filtration to prevent

excessive amounts of radiation from going anywhere other than the intended target. Calculations for half-value layer include any material that is a part of the X-ray machine permanently attached, such as the tube housing. Half-value layer of a given X-ray tube must meet the HVL table in regulations (Table I located on page 297 of the Kansas State Administrative Regulations). For each X-ray system that has variable kVp and variable filtration for the useful beam, a device must link the kVp selector with the filter or filters and will prevent exposure, unless the minimum amount of filtration necessary to produce the required HVL is in the useful beam for the given kVp that has been selected.

What we expect from you: For machines with variable kVp, there should either be enough permanent filtration to sufficiently attenuate the beam at the highest possible kVp setting, or there should be additional filtration that is added when higher kVps are selected. It is your responsibility to ensure that these machines are installed to manufacturer's specifications and all necessary filtration is in place.

Why: Adhering to these regulations will significantly reduce exposure to anywhere other than the intended target. This will help protect your employees and patients from unnecessary radiation.

K.A.R. 28-35-242b(g). ***Mechanical support of the tube head***

The tube housing assembly supports shall be adjusted so that the tube housing assembly remains stable during each exposure, unless tube housing movement is a designed function of the X-ray system.

What this means: Unless designed as a handheld unit, the X-ray machine should be able to hold the position it is put in for an exposure without support from an X-ray worker.

What we expect from you: It is your responsibility to make sure that your employees are not holding the X-ray tube housing during exposures. If the tube cannot hold its position, it is your responsibility to have it repaired. The only exception to this is the handheld dental X-ray units.

Why: This regulation prevents unnecessary exposure to your employees.

K.A.R. 28-35-242b(h). ***Technique indicators***

(1) The technique factors to be used during each exposure shall be indicated before the exposure begins. If automatic exposure controls are used, the technique factors that are set before the exposure shall be indicated.

What this means: Selected kVp, mA, seconds, pulses, etc. must be clearly visible on the control panel of every X-ray unit before an exposure is made.

What is expected from you: It is your responsibility to ensure that the technique displays on all your units are working, and to have them repaired if they are not.

Why: Having working exposure displays allows patient specific technique selection and therefore reduces unnecessary exposure.

K.A.R. 28-35-242b(j) ***Locks.***

All position-locking, holding, and centering devices that are on X-ray system components and systems shall function as intended and shall be maintained according to each manufacturer's recommendations.

What this means: All devices on your X-ray system need to function as they are intended and be maintained as such.

What is expected from you: The locks that hold your X-ray tube in place need to be stable and working. If your X-ray tube drifts out of position during exposure, the exposure will need to be repeated and there will be added exposure to the patient and the X-ray worker.

Why: Maintenance of the locking mechanisms on your X-ray equipment will prevent unnecessary exposure to patients and X-ray workers.

K.A.R. 28-35-244a. ***Radiographic other than Fluoroscopic, dental intraoral or CT***
(a) Beam limitation, except for mammographic systems. Each registrant shall ensure that the useful beam is collimated to the area of clinical interest. This requirement shall be deemed to have been met if a positive beam-limiting device meeting the manufacturer's specifications and the requirements of this regulation has been used or if evidence of collimation is shown on at least three sides or three corners of the film, including projections from the shutters of the collimator, cone cutting at the corners, and borders at the film's edge. (1) General-purpose stationary and mobile X-ray systems including veterinary systems, other than portable systems, installed after the effective date of these regulations. (A) Each registrant shall use only X-ray systems provided with the means for independent stepless adjustment of at least two dimensions of the X-ray field. (B) Each registrant shall ensure that a method is provided for visually defining the perimeter of the X-ray field. The total misalignment of the edges of the visually defined field with the respective edges of the X-ray field along either the length or width of the visually defined field shall not exceed two percent of the distance from the source to the center of the visually defined field when the surface upon which the visually defined field appears is perpendicular to the axis of the X-ray beam. (C) An exemption from paragraphs (a)(1)(A) and (B) may be granted by the secretary for non-certified X-ray systems if the registrant submits a written application for the exemption and that application meets the following conditions: (i) Demonstrates that it is impractical to comply with paragraphs (a)(1)(A) and (B); and (ii) demonstrates that the purpose of paragraphs (a)(1)(A) and (B) will be met by other methods.
What this means: All images must be limited to the area of interest. Manual or automatic collimation satisfy this regulation, as does permanently affixed devices limiting the area that can be exposed. The X-ray collimator must be able to be adjusted to collimate to the area of interest. There must be a way to visualize the perimeter of the X-ray field and the misalignment should not exceed two percent of what is indicated when the X-ray tube is perpendicular to the image receptor.
What we expect from you: It will be evident on your images if your light field and X-ray field are misaligned. You will see this on your images. It is your responsibility to ensure that your collimator is functioning properly and if it is not, a service provider must be called to adjust your collimator. It is also your responsibility to ensure that your X-ray workers are trained to collimate down to the area of clinical interest.
Why: This prevents unnecessary exposure to the useful beam. Your X-ray workers that are holding animals during exposure may be exposed to more of the X-ray beam if the collimators are not adjusted correctly.

K.A.R. 28-35-244a(a)(2) ***Additional requirements for stationary general-purpose X-ray systems.***
In addition to the requirements of paragraph (a)(1), each registrant shall ensure that all stationary general-purpose X-ray systems, both certified and noncertified, meet all of the following requirements: (A) A method shall be provided to indicate when the axis of the X-ray beam is perpendicular to the plane of the image receptor, to align the center of the X-ray field with respect to the center of the image receptor to within two percent of the SID, and to indicate the SID to within two percent. (B) The beam-limiting device shall indicate numerically the field size in the plane of the image receptor to which the device is adjusted. (C) The indication of the field size dimensions and SID shall be specified in inches or centimeters, or both, and shall be such that aperture adjustments result in X-ray field dimensions in the plane of the image receptor that correspond to X-ray field dimensions indicated by the beam-limiting device to within two percent of the SID when the beam axis is indicated to be perpendicular to the plane of the image receptor.

What this means: There must be a way to visualize that the X-ray beam is perpendicular to the image receptor. This can be as simple small level placed on the X-ray tube. The collimator must numerically indicate the field size for each plane. These numerical indications of dimension of the X-ray field should be in inches, centimeters, or both.
What we expect from you: Maintenance of your equipment will ensure that you can visualize both the alignment and field size adjustments of your X-ray field.
Why: This will ensure that your images will not have any distortion from angulation of the X-ray tube and that you will be aware of what size your X-ray field is in relation to your image receptor. Your X-ray field should never be larger than the size of your image receptor.

K.A.R. 28-35-244a(a)(3) ***X-ray systems designed for one size of image receptor.***
Radiographic equipment designed for only one size of image receptor at a fixed SID shall be provided with the means to limit the field at the plane of the image receptor to dimensions no greater than those of the image receptor and to align the center of the X-ray field with the center of the image receptor to within two percent of the SID, or shall be provided with the means to both adjust the size of and align the X-ray field so that the X-ray field at the plane of the image receptor does not extend beyond any edge of the image receptor.
What this means: If your x-ray unit has only one size of image receptor options and a fixed distance, it must be provided with the means to adjust the size and alignment of the X-ray field so that it is no larger than the image receptor.
What we expect from you: If this means of adjustment becomes lost, broken or removed from the X-ray unit, you must make arrangements for another means to meet this regulation by enlisting the services of a qualified service engineer.
Why: This will ensure that your X-ray unit is not allowing an X-ray field larger than your image receptor which will prevent extra exposure to the patient and the X-ray operators.

K.A.R. 28-35-244a(a)(4) ***X-ray systems other than those described in this subsection and veterinary systems installed before the effective date of this regulation and all portable veterinary X-ray systems.***
(A) A means shall be provided to limit the X-ray field in the plane of the image receptor so that the field does not exceed each dimension of the image receptor by more than two percent of the SID when the axis of the X-ray beam is perpendicular to the plane of the image receptor. (B) A means shall be provided to align the center of the X-ray field with the center of the image receptor to within two percent of the SID, or the means shall be provided to both adjust the size of the and align the X-ray field so that the X-ray field at the plane of the image receptor does not extend beyond any edge of the image receptor. Compliance shall be determined with the axis of the X-ray beam perpendicular to the plane of the image receptor. (C) The requirements of paragraphs (a)(4)(A) and (B) may be met with a system that meets the requirements for a general-purpose X-ray system as specified in paragraph (a)(1) or, when alignment means are also provided, may be met with either of the following: (i) An assortment of removable, fixed aperture, beam-limiting devices sufficient to meet the requirements for each combination of image receptor size and SID for which the system is designed, with each such device having clear and permanent markings to indicate the image receptor size and SID for which the system is designed; or (ii) a beam-limiting device having multiple fixed apertures sufficient to meet the requirements for each combination of image receptor size and SID for which the system is designed. Permanent, clearly legible markings shall indicate the image receptor size and SID for which each aperture is designed and shall indicate which aperture is in position for use.

What this means: Your X-ray unit may have several options for meeting the requirements of limiting the X-ray field. Each of these options should not allow the X-ray field to be larger than the image receptor.
What we expect from you: If your X-ray unit is allowing the X-ray field to be larger than your image receptor, it is your responsibility to get this issue addressed by calling a service company.
Why: Limiting the X-ray field exposure prevents unnecessary exposure to the useful X-ray beam and will lessen the exposure to your staff holding animals during exposure.

K.A.R. 28-35-244a(b) ***Radiation exposure control***

(1) Exposure initiation. A means shall be provided to initiate the radiation exposure by a deliberate action on the part of the operator, including the depression of a switch. Radiation exposure shall not be initiated without such an action. In addition, it shall not be possible to initiate an exposure when the timer is set to a ''zero'' or ''off'' position if either position is provided.
(2) Exposure indication. A means shall be provided for visual indication observable at or from the operator's protected position whenever X-rays are produced. In addition, a signal audible to the operator shall indicate that the exposure has terminated.
(3) Exposure termination. A means shall be provided to terminate the exposure at a preset time interval, preset product of current and time, a present number of pulses, or a preset radiation exposure to the image receptor. Except for dental panoramic systems, termination of each exposure shall cause the automatic resetting of the timer to its initial setting or to ''zero.''
What this means: Radiation exposure control has several parts that must be met for regulations. There must be some deliberate action on the part of the operator to initiate exposure; this includes pushing a button. There must be a visual indication that can be seen by the operator whenever X-rays are produced and there must be an audible signal to indicate the exposure has ended. There also must be a mechanism for the exposure to terminate after the preselected time, exposure (mA) or number of pulses has been reached. Essentially, the exposure should automatically terminate once the parameters of the exposure have been met.
What we expect from you: It is your responsibility to ensure that any equipment you possess, or purchase is equipped with these capabilities. If any of these safety mechanisms stop working, it is your responsibility to have them repaired prior to taking any more X-rays with the broken equipment.
Why: These regulations provide X-ray workers with a way to monitor the progress of an exposure, which allows them to more safely do their job.

K.A.R. 28-35-244a(b)(3)(A) ***Manual exposure control.***

An X-ray control shall be incorporated into each X-ray system so that each exposure can be terminated by the operator at any time, except for either of the following: (i) During any exposure of one-half second or less; or (ii) during serial radiography, when a means shall be provided to permit the completion of any single exposure of the series in process.
What this means: The X-ray equipment must have a way to stop the exposure at any time if the exposure is over one-half second in length.
What we expect from you: It is your responsibility to ensure that any equipment you possess, or purchase is equipped with these capabilities. If it is found that this safety mechanism stops working, it is your responsibility to have it repaired prior to taking more X-rays with the equipment.
Why: This regulation provides X-ray workers with a way to stop the exposure in the case of an emergency or some other reason to prevent the exposure.

K.A.R. 28-35-244a(b)(7) ***Operator protection for veterinary systems.***
All stationary, mobile, or portable X-ray systems used for veterinary work shall be provided with either a protective barrier that is at least two meters or 6.5 feet high for operator protection during exposures or a means to allow the operator to be at least 2.7 meters or nine feet from the tube housing assembly during exposures.
What this means: All veterinary X-ray systems must have a protective barrier or a way for the operator to be at least nine feet from the X-ray tube during exposures. This can include a foot switch on a cord of that length.
What we expect from you: It is your responsibility to ensure that the design of the imaging room and location of X-ray equipment allows for these regulations to be met. Employees must be educated on the importance of stepping outside the exam room or behind a protective barrier when X-rays are being taken. It is your responsibility to ensure that your employees are in compliance with these regulations.
Why: Operator and patient safety. By viewing the patient during an exposure, the X-ray worker can watch for motion and consequently cut down on repeat exposures due to motion artifacts. Employees who routinely work around radiation producing devices need to be provided with the means to limit their exposure.

K.A.R. 28-35-244a(d) ***Exposure reproducibility.***
When all technique factors are held constant, including control panel selections associated with automatic exposure control systems, the coefficient of variation of exposure for both manual and automatic exposure control systems shall not exceed 0.05. This requirement shall apply to all clinically used techniques.
What this means: Reproducibility refers to the ability of an X-ray unit to consistently create the same exposure when the same technique factors are selected.
What we expect from you: When your machine is installed, the vendor should ensure that it is operating within manufacturer specifications. This includes checking the reproducibility. Reproducibility is also one of the things we check during inspections. If we inform you that the reproducibility is off, it is your responsibility to have the unit serviced and brought back to within manufacturer specifications. If you notice any changes in your images that could be caused by issues with reproducibility, it is your responsibility to have the machine serviced.
Why: Reproducibility is one way to check that your machine is functioning properly. A properly functioning machine reduces radiation doses and saves everyone time and money.

K.A.R. 28-35-244a(f) **Accuracy.**
Deviation of the measured technique factors from the indicated values of kVp and exposure time shall not exceed the limits specified for each system by its manufacturer. In the absence of manufacturer's specifications, the deviation shall not exceed 10 percent of the indicated value for kVp and 20 percent for exposure time.
What this means: The kVp, and seconds indicated on your control panel should be the actual kVp and seconds that make up the exposure. These values are allowed minimal deviation; 10% for kVp and 20% for time.
What we expect from you: Accuracy is another thing we test for during inspections. If we tell you it needs to be fixed, it is your responsibility to get it fixed. If you notice any changes in your images that could be caused by issues with accuracy, it is your responsibility to have the machine serviced.
Why: Accuracy is one way to check that your machine is functioning properly. A properly functioning machine reduces radiation doses and saves everyone time and money.

K.A.R. 28-35-244a(g) ***mA and mAs linearity.***
The following requirements shall apply when the equipment is operated with a power supply as specified by the manufacturer for any fixed X-ray tube potential within the range of 40 percent to 100 percent of the maximum rated mA or mAs.
(1) Equipment that provides for the independent selection of X-ray tube current (mA). The average ratios (X_{-1}) of exposure to the indicated milliampere-seconds product C kg^{-1} mAs^{-1} (or mR/mAs) obtained at any two-consecutive tube current settings shall not differ by more than 0.10 times their sum. This calculation is written as follows:

$$(X_{-1} - X_2) \leq 0.10\ (X_{-1} + X_2)$$

where X_{-1} and X_2 are the average values obtained at each of two consecutive tube current settings, or at two settings differing by no more than a factor of two when the tube current selection is continuous.

(2) Equipment that has a combined X-ray tube current-exposure time product (mAs) selector, but not a separate tube current (mA) selector. The average ratios (X_{-1}) of exposure to the indicated milliampere-seconds product, in units of C kg^{-1} mAs^{-1} (or mR/mAs), obtained at any two consecutive mAs selector settings shall not differ by more than 0.10 times their sum. This calculation is written as follows:

$$(X_{-1} - X_2) \leq 0.10\ (X_{-1} + X_2)$$

where X_{-1} and X_2 are the average values obtained at each of two mAs selector settings, or at two settings differing by no more than a factor of two when the mAs selector provides continuous selection.
What this means: An increase in mAs should produce proportional increases in radiation exposure.
What we expect from you: When your machine is installed, the vendor should ensure that it is operating within manufacturer specifications. This includes checking the linearity. Linearity is also one of the things we check during inspections. If we inform you that the linearity is off, it is your responsibility to have the unit serviced and brought back to within manufacturer specifications. If you notice any changes in your images that could be caused by issues with linearity, it is your responsibility to have the machine serviced.
Why: Linearity is one way to check that your machine is functioning properly. A properly functioning machine reduces radiation doses and saves everyone time and money.

K.A.R. 28-35-244a(g)(3) ***Measuring compliance.***
Determination of compliance shall be based on 10 exposures taken within one hour, at each of the two settings specified by this subsection. These two settings may include any two focal spot sizes, unless one is equal to or less than 0.45 millimeters and the other is greater than 0.45 millimeters. For purposes of this requirement, focal spot size shall mean the nominal focal spot size specified by the X-ray tube manufacturer.
What this means: Machine compliance is based on 10 exposures taken within an hour at two different exposure settings. These 10 exposures provide the information needed to determine linearity, reproducibility and radiation dose received by your patients.
What we expect from you: This regulation basically describes what we do during an inspection when we are testing your machines. Any time your machine is repaired or a new one is installed; the vendor should do something similar to ensure you are in compliance. It is ultimately your

responsibility to ensure that your machine is in compliance. If we tell you that it is not, it is your responsibility to get it fixed.
Why: This regulation provides a consistent means of testing for machine compliance.

K.A.R. 28-35-244a(h)(3)(i) ***Beam limitation for portable X-ray systems.***
Tube stands for portable X-ray systems. A tube stand, or other mechanical support shall be used for portable X-ray systems, so that the X-ray tube housing assembly does not need to be handheld during exposures.
What this means: An X-ray unit that is a portable system is not to be held in the hands or between the knees to make an exposure. There must be some time of mechanical support provided for this system to hold the X-ray tube.
What we expect from you: Even during cases of equine and bovine exposures, the X-ray tube shall not be held in human hands or between the knees during an exposure. The X-ray unit may be supported by a box, a stand or something similar to prevent exposure to the operator.
Why: Using another means to support the X-ray unit during exposures will prevent unnecessary exposure to the X-ray operator.

Part 10—Notices, Instructions and Reports

K.A.R. 28-35-332. ***Posting of notices to workers***
Link to Notice to Employees RH-3 Form:
http://www.kdheks.gov/radiation/forms/Form_RH-3.pdf

(a) Each licensee or registrant shall post current copies of the following documents: (2) the license, or certificate of registration (3) the operating procedures applicable to work under the license or registration; and (4) any notice of violation involving radiological working conditions
(c) Department form RH-3 shall be posted by each licensee or registrant where individuals work in or frequent any portion of a controlled area.
(d) Documents, notices or forms shall be posted to allow individuals engaged in work under the license or registration to observe them on the way to or from any work location to which the document applies, shall be conspicuous, and shall be replaced if defaced or altered.
What this means: This regulation is self-explanatory; it lists documents and notices required to be posted and accessible to workers.
What we expect from you: It is your responsibility to ensure that your state registration and RH-3 are posted. Department form RH-3 must be posted where individuals work or any portion of a controlled area. This form explains the different parts of regulations as well as other useful information for X-ray workers.
Why: By adhering to these regulations, you are showing your employees and patients that you are registered with the state of Kansas and your X-ray equipment is inspected.

K.A.R 28-35-333(a). ***Instructions to workers***
Each licensee or registrant shall ensure that each individual
(2) is instructed in all of the following subjects: (A) Health protection problems associated with exposure to radioactive material or radiation to the individual and potential offspring; (B) precautions or procedures to minimize exposure; and (C) the purposes and functions of protective devices employed;
(4) is informed of the individual's responsibility to report promptly to the licensee or registrant any condition that has caused or could cause any of the following: (A) A violation of these regulations;

(B) a violation of a license or registration; or (C) unnecessary exposure to radiation or radioactive material;
(6) is informed of the radiation exposure reports that workers may request.
What this means: X-ray workers are to be kept informed of the uses of radiation in the workplace. They are to be educated on the potential safety hazards of working with radiation. They are to be instructed in how to properly use lead shielding and other means to minimize their occupational exposure as well as the exposure of their patients. All radiation workers are required to report improper or dangerous uses of radiation or violations of these regulations to this department.
What we expect from you: It is your responsibility to ensure your employees are aware of the dangers of working around radiation and how to protect themselves and their patients. Many facilities satisfy this regulation by holding regular radiation safety meetings to make sure everyone is on the same page. If you decided to do this, documentation of the meetings and who was in attendance must be kept for us to review during inspections.
Why: Having employees educated in radiation safety will help cut down on unnecessary exposure to not only themselves, but also patients.

K.A.R. 28-35-335. ***Presence of representatives of licensees or registrants and workers during inspection*.**

(a) Each licensee or registrant shall afford to the department, at all reasonable times, opportunity to inspect materials, machines, activities, facilities, premises, and records maintained by the licensee or registrant.
(b) During an inspection, department inspectors may consult privately with workers.
(g) Department inspectors may refuse to permit accompaniment by an individual who deliberately interferes with a fair and orderly inspection.
What this means: Registrants must allow the department the opportunity to inspect their facility. Inspectors may talk privately with workers and may refuse accompaniment by anyone interfering with the inspection.
What we expect from you: Let us do our inspections without interference. Allow us to speak with your employees privately, if requested.
Why: Allowing us to do our job without interference makes the whole process easier and quicker for everyone involved.

K.A.R. 28-35-337. ***Requests by workers for inspections***

(a) Any worker or representative of workers who believes that a violation of… these regulations or a license conditions exists or has occurred… may request an inspection by giving notice of the alleged violation to the department. Any such notice shall be in writing, shall set forth the specific grounds for the notice, and shall be signed by the worker or representative of the workers. A copy shall be provided to the licensee or registrant by the department no later than at the time of inspection except that, upon the request of the worker giving the notice, the worker's name and the name of individuals referred to shall not appear in the copy or on any record published, released, or made available by the department, except for good cause shown.
(b) If, upon receipt of the notice, the department determines that the complaint meets the requirements of subsection (a), and that there are reasonable grounds to believe that the alleged violation exists or has occurred, an inspection shall be made as soon as practicable, to determine if the alleged violation exists or has occurred. Inspections pursuant to this section need not be limited to matters referred to in the complaint.
(c) No licensee or registrant shall discharge or in any manner discriminate against any worker because the worker has filed any complaint, or instituted or caused to be instituted any proceeding

under these regulations, or has testified or is about to testify in any proceeding, or because of the exercise by the worker on behalf of the worker or others of any option afforded by this part.
What this means: Employees can contact the department and request an inspection. If their request is deemed reasonable, an inspection will be scheduled at our convenience. The requesting employee will not be removed from their position or otherwise discriminated against.
What we expect from you: If an employee of yours brings something to our attention that warrants an inspection, you are expected to assist us as necessary and allow us to inspect your facility. You are not allowed to retaliate against the complainant.
Why: It is important that employees be allowed to voice their concerns with the department without fear of retaliation.